Third United Nations International Conference on the Peaceful Uses of Atomic Energy

A/CONF.28/A/717
IAEA
February 1964
Original: ENGLISH

Confidential until official release during Conference

Abstract

SURVEY OF NUCLEAR DATA FOR REACTOR CALCULATIONS

Nuclear Data Unit, IAEA, Vienna

Since the 1958 Geneva Conference, developments in measuring methods have resulted in a great increase in the amount of detail available for neutron cross-section data for important nuclei as a function of the energy of the incident neutron. Improvements in techniques, especially for fast neutron studies, and in resolution in the "resonance" region, have been most marked. In spite of this, and an accompanying increase of accuracy of the data, a number of important uncertainties and inconsistencies remain, which will be reviewed in the paper. The extent to which further increases of detail or accuracy are still needed will also be briefly considered. A few quantities will be selected for attention to illustrate the problem, in particular the thermal neutron constants for the fissile nuclei of U and Pu.

The compilation and evaluation of nuclear data and its preparation for use in particular reactor computation codes has become a quite sophisticated process and the part which the IAEA can play in this work will be briefly discussed. The sources of information in this field and the published volumes of compilations will be reviewed, from the point of view both of the effort involved in their production and of their use for particular applications. Particular difficulties concern the need for critical judgement in reconciling discordant measurements and interpreting certain effects connected with the experimental techniques used. There are also cases where no measurements exist and where theory has to be used to provide values. Finally, the result is a set of values of the cross-section or other quantity involved, as a function of neutron energy; from this group averages or other needed values can be derived.